

In the Matter of)	
)	
Section 68.4(a) of the Commission's Rules)	
Governing Hearing Aid)	WT Docket No. 01-309
Compatible Telephones)	RM-8658
)	

COMMENTS
OF
AMERICAN NATIONAL STANDARDS INSTITUTE
ACCREDITED STANDARDS COMMITTEE 63 (EMC)
SUBCOMMITTEE 8 (Medical Devices)
ANSI ASC C63 SC8

American National Standards Institute Accredited Standards Committee 63 (ANSI ASC C63) for ElectroMagnetic Compatibility (EMC) Subcommittee 8 (Medical Devices) thanks the FCC (Commission) for the opportunity to provide these comments in response to the Notice of Proposed Rulemaking (NPRM), FCC 01-309, issued in the above-captioned docket, regarding proposed changes to the exemption for public mobile telephones to the rules governing Hearing Aid Compatibility (HAC).¹

As the ANSI accredited committee to coordinate EMC standards in the US, ANSI ASC C63 has had a longstanding interest in all issues of electromagnetic interference, including interference involving medical devices and telecommunications products. Further, as the central coordinating body for electromagnetic interference issues in the US, ANSI ASC C63 and its collective membership arguably represent the best technical expertise available in the US on issues of interference.

The recent history of this issue was initiated in 1995 by a petition to the FCC from the HEAR-IT NOW Coalition. Then FCC chairman Reed Hundt responded to this petition by calling the interested parties together in what came to be called the HAC Summit. It was as a

¹ See 47 U.S.C. §610(b)(2)(B)

result of the HAC Summit-discussions that ANSI ASC C63 became involved in this issue. Summit participants determined that a standards development program was needed to establish the equipment requirements, and methods of measurement, for achieving Hearing Aid Compatibility and Accessibility to Wireless Telecommunications. Subsequently, ANSI ASC C63 SC8, Medical Devices, was asked to undertake this standards effort.

Early in 1996, ANSI ASC C63 was approached with a request to initiate a project that would write a standard dealing with the issue of interference to hearing aids in the presence of mobile telephones or other wireless devices. At its April 1996 meeting, ANSI ASC C63 formally established a working group under its subcommittee on medical devices (Subcommittee 8). The charge to this working group was to carry out its work in cooperation with representatives of organizations representing people with hearing loss, hearing aid manufacturers, the digital and analog wireless telephone industry and other interested parties.

The final standards, ANSI C63.19, *The American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids*, was approved in December 2000 and published in early 2001. Notably both the FCC and FDA had members on the committee and voted for its adoption, both at the working group level and as members of ANSI ASC C63.

We are concerned that in this NPRM the Commission appears to be relatively unfamiliar with the ANSI C63.19 standard and the encouraging changes that have been taking place as a result of the cooperative effort between the two industries. As the standard neared completion the University of Oklahoma Center for the Study of Wireless EMC performed two studies validating the standard. The following quote is found at the end of the studies' summary:

In summary, the results of this study support the use of acoustic measurements of immunity as the basis for the ANSI C63.19 standard. The results also demonstrate the existence of hearing aids that can be used with success with a number of digital phones. Six of the eighteen aids demonstrated no interference or very slight interference at the highest power level when used with both 800 MHz and 1900 MHz phones. These

conclusions provide an encouraging forecast of substantially improved access to digital wireless service by those individuals with impaired hearing.²

In fact the results of the study are even more encouraging. The study shows the standard to be 94.4% effective in predicting the desired outcome. Further, while 6 of the 18 aids used in the study were sufficiently immune with all phones other hearing aids in the study were usable with some phones. In fact 68% of the hearing aid / mobile phone combinations in the study performed at recommended levels or better.

We are at a point in history where through cooperative efforts a consensus standard has been produced and an encouraging trend of compliant products is emerging. It would be very distressing if through lack of information the Commission initiated new processes that may well stop this encouraging trend and further delay the resolution of the issue of wireless hearing aid compatibility. Instead the Commission should carefully examine the current situation and encourage the ongoing consensus process in addressing the remaining issues and to successful completion.

I. ANSI Process Assures a Technically Accurate, Balanced, Consensus Solution

² Schlegel, RE, Grant, H, Matthews, P, Scates P., "Evaluation of the Interaction Between Wireless Phones and Hearing Aids: Phase III-B: Subjective Validation Study", Center for the Study of Wireless Electromagnetic Compatibility, University of Oklahoma, 2001. Available at www.ou.edu/engineering/emc.

The ANSI consensus standards process has been carefully developed over many years to assure technical accuracy, balance and consensus in its standards. It involves not only a formal consensus process for adoption within C63 but also review by the general public for the ANSI review process. ANSI C63.19 was developed under these processes and represents a balanced and technically accurate solution to the complex and multi-faceted issue of wireless hearing aid compatibility.

During the course of its existence the ANSI C63.19 committee had over 100 engineers and researchers from over 50 organizations participate in its work. As the committee dealt with its task it discovered that the issues involved in wireless hearing aid compatibility are far more complex and demanding than would be generally perceived by the non-technical layman. To accurately deal with the issue and develop a robust and accurate solution the committee found it necessary to have at its disposal experts in:

- Psycho-acoustics and hearing loss
- Hearing aid design
- Wireless telephone design
- RF & electromagnetic compatibility
- Signal transmission and signal integrity
- Experimental design and conformity assessment

The committee was very gratified to have experts at its disposal in these and other related disciplines. The absence of any one of these technical specialties would have resulted in a weaker product with the potential for critical errors in the technical area lacking representation.

Not only did the committee have a wide variety of technical experts but six different research studies were conducted in close cooperation with the working group. These research studies provided invaluable information to the working group. After a mature draft was available two of these studies validated that the standard had achieved its goal.³

³ The committee benefited greatly from a number of research projects investigating the hearing aid interference issue.

Three of the significant early studies were:

- European Telecommunications Standards Institute, “GSM EMC Considerations”, ETSI Technical Report GSM 05.90, Valbonne Cedex, France, 1993.
- Joyner, KH, Wood, M, Burwood, E, Allison D., Le Strange, R., “Interference to Hearing Aids by the New Digital Mobile Telephone System, Global System for Mobile Communications Standard”, National Acoustic Laboratories, Australian Hearing Services, 1993.
- European Hearing Instruments Manufacturers Association, “Hearing Aids and GSM Mobile Telephones: Interference Problems, Methods of Measurement and Levels of Immunity”, GSM Project Final Report, Wommel, Belgium, EHIMA, 1995.

During the course of the committee’s work the University of Oklahoma conducted a series of very helpful research studies. The last two in this series were specifically tasked with validating the draft standard and documenting the degree to which the standard resolved the problem being addressed.

- Ravindran, A, Schlegel, RE, Grant, H, Matthews, P, Scates P., “Evaluation of the Interaction between Wireless Phones and Hearing Aids, Phase I: Results of the Clinical Trials”, EMC Report 1996-2, Center for the Study of Wireless Electromagnetic Compatibility, University of Oklahoma, 1996.
- Ravindran, A, Schlegel, RE, Grant, H, Matthews, P, Scates P., “Measures of Interference to Hearing Aids from Digital Phones”, Hearing Journal, 50:32-34, 1997.
- Schlegel, RE, Grant, H, “Modeling the Electromagnetic Response of Hearing Aids to Digital Wireless Phones”, IEEE Transactions on Electromagnetic Compatibility, 42:347-357, 2000.
- Schlegel, RE, Srinivasan, S, Grant, H, Shebab, RL, Raman, S., “Clinical Assessment of Electromagnetic Compatibility of Hearing Aids and Digital Wireless Phones”, Proceedings of the 42nd Annual Meeting of the Human Factors and Ergonomics Society, 1023-1027, 1998.
- Srinivasan, S, Schlegel, RE, Grant, H, “Evaluation of the Interaction between Wireless Phones and Hearing Aids, Phase II-B: Clinical Determination of the Speech-to-Interference Ratio”, EMC Report 1997-2, Center for the Study of Wireless Electromagnetic Compatibility, University of Oklahoma, 1998.
- Schlegel, RE, Grant, H, Matthews, P, Scates P., “Evaluation of the Interaction Between Wireless Phones and Hearing Aids: Phase III-B: Subjective Validation Study”, Center for the Study of Wireless Electromagnetic Compatibility, University of Oklahoma, 2001. Available at www.ou.edu/engineering/emc.

We caution the Commission to not ignore the complexity of the issue addressed in this NPRM. Without significant technical review from a variety of technical specialties there is great danger in producing a deeply flawed and ineffective solution.

II. The ANSI C63.19 Solution has undergone multiple public reviews and has been widely recognized and affirmed

ANSI C63.19 has already undergone multiple reviews by several federal agencies and been proposed and accepted in multiple publicly commented rulemakings. This standard has been cited by two federal advisory committees and reviewed and used by no less than four federal agencies. Both the FCC and FDA are members of ANSI ASC C63, had participants on the ANSI C63.19 working group and voted in favor of the standard, both at the working group and full committee level. In addition the standard and its drafts were reviewed and cited in the following proceedings, reports and rulemakings:

Jan. 1997	Telecommunications Access Advisory Committee (TAAC) Report
Feb. 1998	Access Board Section 255 Telecommunications Access Guidelines, 36 CFR 1193
Sept. 1999	FCC Section 255 Rulemaking, WT Docket 96-198
Oct. 1999	Access Board Market Monitoring Report
May 1999	Access Board Section 508 Standard, 36 CFR 1194
June 2001	Access Board Technical Guidance for Section 508
Dec. 2001	Federal Election Commission Voting System Standard

In January 1997 the Telecommunications Access Advisory Committee (TAAC), a US Federal Advisory Committee to the US Architectural and Transportation Barriers Compliance Board (Access Board) states the following in its section on non-interference with hearing technologies:

C-4: Non-Interference with Hearing Technologies

Guideline: Where readily achievable, products shall not cause interference with hearing technologies (including hearing aids, cochlear implants, and assistive listening devices) which are used by a product user or bystanders.

Rationale: Individuals who are hard of hearing use hearing aids and other assistive listening devices, but they cannot be used if products introduce noise into the listening aids because of stray electromagnetic interference.

Example strategies for achieving this guideline:

Strategies for reducing interference (as well as improving hearing aid immunity) are being researched. The most desirable strategy is to avoid the root causes of interference when telecommunications equipment is initially designed. The industry should work toward transmission and channel-sharing technologies that do not generate interference, and should test new technologies for possible interference with assistive technologies.

If the root sources of interference cannot readily be removed, then shielding, placement of components to avoid hearing aid interference, and field-canceling techniques are among those that may be effective.

The ongoing work of ANSI C-63, which is working toward improvements in usability of certain phones by wearers of hearing aids, should be monitored and incorporated if a standard is adopted.⁴

The statements of the TAAC are significant in that they are the consensus opinion of a committee composed of recognized experts coming from all stakeholder groups. Two aspects of this statement in particular should be noted. First, under the recommended strategies as system approach is taken. It is recommended that interference be dealt with either by limiting or changing the telephone transmission or improving the immunity of the hearing aid. The report clearly identifies that a system approach must be taken.

Secondly, the TAAC report commends the ANSI ASC C63 process and was anticipating that the result would be an important tool in resolving the issue.

Subsequently the Access Board submitted its own ruling. After receiving wide public comment it issued the following statement and conclusion:

⁴ Bolding and italics added for emphasis.

Paragraph (h) Non-interference with hearing technologies

Comment. Persons with hearing impairments uniformly supported this provision. Manufacturers, however, said it posed problems with respect to wireless telephones. They pointed out that the provision as written specified zero interference whereas, that was not physically possible. Interference could only be reduced so far, they said, and both the telephone and the hearing aid played a role. They urged the Board to defer any such requirement until the ANSI C63 Committee had finished its work. Some manufacturers also objected to the requirement's coverage of bystanders as outside the Act's jurisdiction. Also, the Trace Center viewed interference as a compatibility issue which should be addressed in Subpart D where it is repeated.

Response. The Board agrees that interference levels are a complex issue and cited the work of the ANSI C63 Committee in the NPRM. Interference is a function of both the hearing aid and telephone, and the C63 Committee is seeking to define "acceptable" levels of interference with respect to types of hearing aids and classes of telephones. The standard would also prescribe testing protocols. The Board does not believe, however, that it should defer a requirement until the ANSI Committee has finished its work, but it does expect the Committee's work to help clarify what is readily achievable. Therefore, the provision has been modified slightly in the final rule to emphasize that products are to produce the least interference possible. In subsequent revisions to these guidelines the Board will propose standards for RF emissions and will consider the results of the ANSI C63 Committee, if they are available, in developing such standards.

In its final rulemaking the Access Board concluded:

Non-Interference with Hearing Technologies

1. Individuals who are hard of hearing use hearing aids and other assistive listening devices but these devices cannot be used if a telecommunications product introduces noise into the listening aids because of stray electromagnetic interference.
2. Strategies for reducing this interference (as well as improving hearing aid immunity) are being researched. The most desirable strategy is to avoid the root causes of interference when a product is initially designed. If the root sources of interference cannot be removed, then shielding, placement of components to avoid hearing aid interference, and field-canceling techniques may be effective. Standards are being developed to limit interference to acceptable levels, but complete elimination for some technologies may not yet be practical.

3. *In April 1996, the American National Standards Institute (ANSI) established a task group (ANSI C63) under its subcommittee on medical devices to develop standards to measure hearing aid compatibility and accessibility to digital wireless telecommunications. The C63.19 task group is continuing to develop its standard, C63.19-199X, American National Standard for Methods of Measurement for Hearing Aid Compatibility with Wireless Communications Devices. When the standard is completed, the Board intends to reference it in this appendix.*⁵

Again the system approach, including both the telephone and hearing aid are noted. In addition this rulemaking, published on February 3, 1998, clearly is aware of and views favorably the direction of the ANSI ASC C63 committee and its working group which developed the C63.19 standard.⁶

Subsequent to the release of its Section 255 Guidelines the Access Board conducted a Market Monitoring Report to assess the then current state of telecommunications accessibility. In reviewing the accessibility of wireless telephones the report states:

Wireless telephones

Wireless telephone technology is one of the fastest growing telecommunications services in the world. Total subscribership in the United States grew 13-fold from 1990 to 1998 and continues to grow more than 13% a year even as its market matures.

Wireless offers the ability to be reached anywhere and any time, using a personal device selected from among diverse models and configured by each customer. It brings with it both attractors and barriers for people with disabilities.

On the positive side, wireless phones free individuals from reliance on public pay phones, which may be hard to find or use. Wireless phones are small and light, advantages for people with limited strength or range of motion. Some have jacks allowing for connection to external equipment and are compatible with TTYs, headsets, or hearing aid silhouettes. Wireless phones all use “buffer dialing,” which allows users to check the digits before they dial.

⁵ Bolding and italics added for emphasis.

⁶ “**American National Standard for Methods of Measurement of Compatibility between Wireless Communication Devices and Hearing Aids**”, IEEE ISBN 0-7381-3019-2; Product No.: SH94960-TBR; IEEE Standard No.: C63.19-2001. This standard may be ordered at: shop.ieee.org/store.

A wireless phone, seen as a personal device that is equipped or retrofitted with certain access features, allows its user to make and receive calls independently, essentially carrying a key piece of customized technology wherever he or she goes. Whether embedded in the handset or the wireless network, wireless telephony can offer access features like voice dialing, paging or longer text messaging, and vibrating ringers.

Hearing aid and cochlear implant interference from digital wireless handsets

Analog wireless handsets do not pose any interference problems for hearing aid wearers. (Note that this does not mean that hearing aid wearers can use all analog wireless phones. Many analog phones are not hearing aid compatible, meaning that they do not have a coil compatible with hearing aid T-coils.) However, almost all digital handsets cause some amount of interference with almost all types of hearing aids and cochlear implants. The problem is not the digitized voice signal itself, but the technologies the handsets use to maintain an optimized connection with the cell sites. This is heard as a buzz. The type of buzz and its volume are a function of the wireless platform used, the user's distance from a cell site and motion relative to it, the type of hearing aid, and the interaction between the handset and the hearing aid. Subtle differences in types of aids and how they are worn and how handsets are placed with respect to the hearing aid cause great differences in the buzz. Beyond this, users have different subjective experiences of the buzz and different tolerances for it.

The wireless industry and the hearing aid industry are working together to reduce the interference, both by reducing the magnitude of the extraneous electromagnetic signal emitted by the handsets and the immunity to that signal on the part of hearing aids. Currently the best approach for hearing aid wearers is to try out a number of phones in a number of positions to get a feeling for what the interference is like and their ability to accept it.

Recent work by the ANSI standards committee working on this issue (ANSI C63.19) indicated that a combination of hearing aid immunity and reduced handset emission results in lower interference that is acceptable for use by many hearing aid consumers. These combinations are found in some existing phones and hearing aids. Although there are certain hearing aids that still do not work with any wireless telephones, of the telephone-hearing aid combinations that did provide access, users were able to obtain 95% word recognition with little or no hearing aid interference. The telephones tested spanned the various wireless technologies (TDMA, CDMA, and GSM), and are currently commercially available products.⁷ These were laboratory tests; field tests with actual

⁷ Bolding added for emphasis.

hearing aid users in normal wireless usage conditions must be completed before it is reasonable to conclude how realistic the laboratory tests were.

The volume of the interference depends on the distance between the phone and the hearing aid. Any method of separating the two decreases the interference. Hands-free kits, such as those with a headset with microphone, a connection to an automobile audio system, or a neckloop achieve this separation.

The report also contains a recommendations section. In its recommendations the market monitoring report advocates:

D1. Support Standards Work

Given the range of disabilities, their severity, and the individual interests and needs of people with disabilities, it is unlikely that “accessibility” can ever be rendered completely objective. However, there are areas in which objective standards could be developed that would simplify the process of design and testing. This same information delivered to potential consumers would simplify their purchasing decisions.

Some of this work is already underway. The International Telecommunications Union (ITU) has developed a text telephone interoperability standard (v.18 -- see Appendix I) and several other Working Groups are proceeding to guarantee that text communication is included in videotelephone, Internet telephony, and other standards related to emerging technologies (T.120, T.134, T.140). Other international groups have addressed the access issues of smart cards and keyboard tactile indicators (nibs) from a standards perspective. **IEEE’s C.63.19 Committee is working on hearing aid compatibility for wireless phones, extending the existing standard for hearing aid compatibility developed by EIA, RS-504.**⁸

D2. Help Develop Testing Protocols

Corresponding to the standards work in Recommendation D1 would be testing protocols. Wherever obvious measurements are absent, manufacturers should be given clear directives about how to test for compliance. These would be especially useful where subjective input is needed from typical or representative individuals with disabilities. ...

⁸ Bolding added for emphasis.

Subsequent to the Access Board release of the Section 255 Guidelines the FCC conducted its own rulemaking implementing and enforcing Section 255.⁹ In that rulemaking special attention was given to the hearing aid compatibility provisions, as noted in the exception to the volume control section of the guidelines. However, the related provision recommending ANSI C63.19 for wireless hearing aid compatibility was accepted.

12. A summary of the decisions in this Order is provided below:

■ We adopt rules identical to or based upon the Access Board guidelines, with a few minor exceptions.

25. We do not adopt section 1193.43(e) of the Access Board rules, which would require that volume control telephones provide a minimum of 20 dB adjustable volume gain. We decline to adopt this 20 dB volume control standard under our rules because it conflicts with rules that we have previously adopted pursuant to the Hearing Aid Compatibility Act.¹⁰ While we recognize the rationale behind Access Board's decision to provide a more stringent volume control standard, we decline to supersede existing Commission rules developed under a lengthy negotiated rulemaking pursuant to a section of the Act focused expressly on this issue. Furthermore, because the industry has, since 1997, been making plans to incorporate our HAC Act volume control requirements in all telephones to be manufactured in, or imported for use in, the United States after January 1, 2000, it would be unduly disruptive and burdensome for us to alter the volume control technical standards at this time.

In 1998-1999 the Access Board convened another advisory committee. The Electronic and Information Technology Access Advisory Committee was convened to advise the Access Board about the implementation of CFR 1194, Section 508. The EITAAC issued its report on May 12, 1999. In section 5.2.1.15, Hearing Aid Compatibility, the report states:

5.2.1.15 Hearing aid compatibility.

⁹ WT Docket 96-198.

¹⁰ 47 U.S.C. § 610. Under section 68.6 of the Commission's volume control rules, 47 C.F.R. 68.6, all wireline telephones (including cordless telephones) manufactured or imported for use in the United States as of January 1, 2000 must have a volume control feature in accordance with detailed technical specifications at 47 C.F.R. 68.317. In general, these technical specifications require analog and digital telephones to provide between 12-18 dB of volume gain. *See* 47 C.F.R. § 68.317.

5.2.1.15.1 Where an E&IT delivers output by an audio transducer which is normally held up to the ear, provide a means for effective magnetic wireless coupling to hearing aids. If the E&IT communicates by RF, electromagnetic compatibility with hearing aids shall be addressed. EIA RS-504 defines the signal level requirements for this section. ***ANSI C63.19 (draft) provides the tests and parameters for compatibility between hearing aids and wireless communications devices including magnetic (t-coil) and electromagnetic compatibility. [NOTE: ANSI C63.19 (draft) applies and extends the requirements of EIA RS-504 for use with wireless communications devices. It provides more specific guidance for cases where an RF transmission field is also involved.]***¹¹

At this time the ANSI C63.19 was relatively mature and validation studies had been initiated.¹² The EITAAC committee clearly identifies the ANSI C63.19 standard as the correct technical specification for dealing with hearing aid compatibility with wireless devices.

On June 21, 2001 the Access Board release new technical guidance for the Section 508 standard. Regarding wireless hearing aid compatibility the guidance states:

(i) Interference to hearing technologies (including hearing aids, cochlear implants, and assistive listening devices) shall be reduced to the lowest possible level that allows a user of hearing technologies to utilize the telecommunications product.

Why is this provision necessary?

This provision largely grew out of complaints about digital cellular phones by hearing aid users. Some hearing aid users heard a humming sound coming from the phone and this interfered with the ability to hear the conversation. This problem existed for both hearing aid users with t-coils as well as those without t-coils. See discussion of provision (h) (previous) for an explanation of a t-coil.

Who and what does the provision apply to?

This provision was carefully worded so that it could apply to listening technologies other than hearing aids, such as cochlear implants and assistive listening systems. In addition, although digital cellular phones were identified as

¹¹ Bolding and italics added for emphasis.

¹² The OU studies are available on its web site: www.ou.edu/engineering/emc/

one source of interference, there may be other electronic and information technologies that cause interference.

How can interference be determined?

The ANSI/IEEE C63.19 Standard, available from the American National Standards Institute, can be used to assess electromagnetic characteristics of hearing aids and wireless phones for the purpose of determining compatibility. The FCC, consumer groups and the telecommunications industry are now discussing plans for educating the public about this cell phone/hearing aid compatibility standard.^{13,14}

On December 13, 2001 the Federal Election Commission (FEC) published for public comment proposed revisions to its Voting System Standard. The FEC standard sets the national measure for voting equipment and is implemented through the Voting System Standard Board of the National Association of State Election Directors.

Volume 1 Section 2.2.7 of the FEC Voting System Standard deals with Accessibility. In Section 2.2.7.2(d) it requires:

*d. Meet the requirements of ANSI C63.19-2001 Category 4 to avoid electromagnetic interference with assistive hearing devices;*¹⁵

In summary, through multiple public reviews and evaluation ANSI C63.19 has been found to be a complete and effective solution in addressing the issue of wireless hearing aid compatibility.

III. The ANSI C63.19 Solution is Technically Complete & Effective

As has been stated, the ANSI C63.19 project came from the FCC HAC Summit in 1996. Originally two projects were proposed. The first was a Method of Measurement of Immunity of Hearing Aids to Cellular Telephone Transmission. The second was to define parameters and limits required for hearing aid and digital telephone to work compatibly. As the

¹³ Bolding and italics added for emphasis.

¹⁴ ANSI C63.19 may be ordered online from shop.ieee.org/store.

¹⁵ Bolding and italics added for emphasis.

committee pursued its work these two tasks were completed and the combined result published as ANSI C63.19.

Thus the project was tasked with developing both parameters for compatibility and measurements of those parameters. It is important to note that the committee was technically focused on the goal of wireless hearing aid compatibility. It was free, in fact tasked with finding a complete solution. The committee was not constrained by historical regulatory boundaries or legislative language. In reviewing the technical elements identified for a complete solution one realizes that the solution exceeds the limits of both the 1988 HAC Act and any single regulatory agency. In order to provide a complete and effective solution requirements are placed on both the hearing aid and the wireless telephone.

The committee, having at its disposal an impressive array of experts from both industries, recognized that any single solution would be simultaneously incomplete and overreaching. Given the tremendous array to technologies implemented in both hearing aids and wireless mobile telephones no single solution is appropriate to all products. Many hearing aids are capable of being economically designed to be very immune to RF emissions. Others, especially in certain niches of the market, are relatively sensitive to RF emissions. Similarly wireless telephones are available using a broad range of technologies.

Moreover, on careful technical analysis the issue raised is not a single problem but a family of problems. There is the issue of RF interference. A second issue is low frequency, in-band interference to the T-Coil signal. Other issues identified deal with the acoustic coupling of the phone to the hearing aid, the signal integrity and purity of the T-Coil signal, the audio band frequency response of both the acoustic and T-Coil signal. Other problems are directly related to individual hearing loss and peoples ability to recognize speech. The committees work was validated as resolving the issues it addressed. However, the

Commission should be aware that not all problems of hearing loss have been resolved. The complexity of the situation provides a real danger that effective solutions may be rejected because symptoms from other, different problems remain.

A major milestone for this project was the validation study of the standard using people with a wide variety of hearing loss. The University of Oklahoma Center for the Study of Wireless EMC working together with the Hough Hearing Institute performed this critical study. In the study it was demonstrated that the standard was 96% predictive of a hearing aid wearer's ability to use a digital wireless telephone. The inclusion in the study of a wide variety of hearing loss profiles assures the general effectiveness of this standard.¹⁶

IV. The Technical Provisions applied by Lifting the Exemption do not resolve the Problem being addressed

In this NPRM the Commission asks if "lifting the exemption" is in the public interest. This is impossible to determine with the limited technical information given. The 1988 HAC Act and the implementing FCC regulations were developed before digital wireless communications were in common use. Simply "lifting the exemption" would require mobile phones to comply with the requirements of 47 CFR 68.316 and perhaps 47 CFR 68.317. However, 47 CFR 68.316 only requires a raw magnetic field from the handset. Further, the level required is referenced to the voltage on the wires to the telephone!

Far more is required to provide the intended result of a hearing aid user being able to use a digital wireless telephone. First, a set amount of RF immunity must be provided in the hearing aid. Mobile telephones cannot operate without transmitting RF and therefore it is impossible to provide the intended result without some known level of immunity in the hearing aid. To resolve the interference possible it is absolutely required that the RF level of the mobile

¹⁶ The study is available from the University of Oklahoma Center for the Study of Wireless Electromagnetic

handset transmission be matched with the RF immunity of the hearing aid. Without dealing with both sides of the problem as a system approach, a solution is not possible.

Resolving the interference problem alone is not enough. If wireless coupling in addition to acoustic coupling is desired then a magnetic signal must be provided that in fact carries the voice signal. Further the magnetic signal must have sufficient signal clarity so that the voice signal will be clearly heard. Moreover, the levels for this magnetic signal established for landline phones many years ago are increasingly ineffective. As hearing aids are getting smaller the receiving elements in them are also getting smaller. The working group received many reports that many and perhaps even most hearing aid users are not able to use their T-Coil mode with wireline “hearing aid compatible” telephones. The ANSI C63.19 working group identified all of these issues and provided for them with a complete system solution that provides a full solution for hearing aid users to use mobile telephones.

V. The Consensus Process Appears to be Working Effectively

Before the ANSI C63.19 standard was completed several studies were conducted at the University of Oklahoma Center for the Study of Wireless EMC. These studies verified that equipment meeting the requirements of the standard had a better than 95% correlation to the intended result of a user being able to use a mobile telephone. Further, over 65% of the hearing aid and mobile phone combinations measured in the study performed at recommended levels.

The ANSI C63.19 working group has an ongoing program to monitor the effectiveness of its standard. The working group has received many reports of improving hearing aid immunity and reduced mobile phone emissions near the user’s ear.

At the latest meeting of the working group in Chicago on August 29, 2001 a question was asked, “Is anyone aware of a large number of complaints on this issue or anything but a declining pattern or complaints?” The participants in the meeting include both hearing aid

manufacturers, mobile telephone manufacturers and their trade organizations. Nobody was aware of any large number of complaints. Most hearing aid manufacturers reported having improved the RF immunity of their products and resolving complaints the few remaining complaints on a case-by-case basis.

It would appear that the collaboration of the two industries is producing a positive trend toward the resolution of this issue. We encourage the Commission to be cautious that it does not base its decision in this matter on old data of a prior condition. Rather the Commission should gather data on the current status and trends. It appears probable that where problems continue they are in the lowest cost devices and in highly specialize types of devices.

VI. ANSI Standards Process provides for Ongoing Improvement and Technical Currency

A central feature of the ANSI standards process is the ongoing improvement of all ANSI standards. ANSI standards are required to be review at least every five years for technical currency, accuracy and continuing utility. If warranted a standard may be updated at any time. This ongoing process assures the continuing development, improvement and currency of all ANSI standards. In addition, there is in place a formal mechanism for interpretations and clarifications of the standards should that be required before the next edition of the standard.

This ongoing improvement process is already being utilized to refine ANSI C63.19. Hearing aid manufacturers found in using ANSI C63.19 to assess their products RF immunity that a different test device may allow a more repeatable test. In addition, some changes may be needed to accommodate new frequencies for 3rd generation mobile telephones. The ANSI C63.19 working group is looking at these issues and may recommend refinements to the standard as a result of their investigations.

ANSI ASC C63 SC8 urges the FCC to utilize this ongoing improvement process. The FCC is encouraged to bring data at its disposal regarding trends in consumer complaints

and other information that may help further improve the standard. Future revisions can utilize such data and implement it in an overall system solution. Finally, the FCC is urged to continue its membership in the working group so that its immediate needs are fully aired.

VII. Conclusions

ANSI ASC C63 SC8 recommends that the Commission not adopt this NPRM. A single sided and incomplete solution does not serve the public interest or hearing aid users. Instead we encourage the FCC to participate more actively in the gathering of data on the current state of this issue and its trends. The FCC should bring such information to ASC C63 SC8 and its ANSI C63.19 working group, where a complete system solution may be pursued.

We thank the Commission for this opportunity to comment on this proposed rulemaking.

Respectfully submitted,

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